

Improved MLT and its applications to solar models

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The most uncertainties in present solar modeling lie in the treatment of convection. The MLT, which is the commonly adopted approach to determine the convective energy transport and temperature stratification, assumes that the convection cells are of the same size of the mixing length and move upon the drive of the buoyancy, and ignores some important properties of turbulence such as the tendency of approaching isotropy and distribution of kinetic energy among convection cells of different sizes. Based on turbulence models, we improve the MLT by incorporating the anisotropic degree and radiative dissipation rate, and investigate the effects of these improvements on solar models. It is found that different degree of anisotropy and radiative dissipation rate have considerable effects on the temperature stratification of the solar envelope.

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